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DESCRIPTIONS OF NORTH AMERICAN SENECEIONEÆ¹

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The following descriptions and notes are the results obtained from a critical study of material in several herbaria during the preparation of a monograph of the North American species of the genus *Senecio*. Some of the species here described have been in manuscript a number of years and a few of them have been withheld from publication, because of incomplete specimens, hoping that additional material might be brought together before publication. In many cases supplementary and substantiating material has been obtained from which it is now possible to make fairly complete diagnoses. In one or two instances a reconsideration of certain natural groups within the genus, in the light of recent collections, has made it possible to combine forms which formerly were taken to represent distinct species. Very few new species have resulted from recent collections, but there are still many regions, particularly in Central America, which are inadequately explored. The writer would welcome material in this genus from any part of North America in order that the geographical range of species may be recorded as accurately as possible in his forthcoming monograph. The sections indicated in parentheses immediately following the generic name are in accordance with my preliminary paper to which reference is made under the species.

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Senecio (§ Aurei) hyperborealis Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

S. resedifolius Hook. Fl. Bor. Am. 1: 333. pl. 117. 1833, not Less.

Herbaceus perennis; caule simplice vel ramoso suberecto 1–2 dm. alto plus minusve foliaceo juventate glabro vel parce floc-culoso-tomentuloso sæpe ad basin et in axillis foliorum per-sistenter lanato-tomentoso; foliis inferioribus petiolatis indivisis vel plerumque irregulariter lyrato-pinnatifidis 4–10 cm. longis 1–2.5 cm. latis, lobis remotis; foliis superioribus multum reductis sessilibus et bracteiformibus; capitulis paucis terminalibus radi-atis 10–12 mm. altis 2–3.5 cm. (radii inclusis) diametro; floribus femineis 10–12, ligulis flavis 10–12 mm. longis ca. 2 mm. latis; disci flosculis numerosis; achæniis sæpe paulo hispidulis.

Specimen examined:

Canada: Arctic America, *Hooker* (Gray Herb.), TYPE.

Var. **columbiensis** (Gray) Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

S. resedifolius var. *columbiensis* Gray, Syn. Fl. 1²: 390. 1884.

Habitu formae typicæ; capitulis heterogamis, ligulis floris femineis quam squamis involucri paulo brevioribus; achæniis glabris.

Specimen examined:

British Columbia: Mucklung River, 25 July, 1882, *Mr. Mackay* (Gray Herb.).

Senecio (§ Lobati) proluxus, comb. nov.

S. diffusus Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen, not Linn. f.

Herbaceus perennis glabrus vel in axillis foliorum albo-tomentosus; caule tereti striato simplici vel ramoso erecto 2–5 dm. alto; foliis petiolatis vel sessilibus inferioribus lyrato-pin-natifidis petiolo incluso usque ad 15 cm. longis 1.5–5 cm. latis utrinque glabris, segmentis lateralibus oblongo-cuneatis cum sinis altis rotundatis disjunctis granditer dentatis, superioribus remotis sessilibus pinnatifidis sursum multum reductis; inflores-centiis laxo corymboso-cymosis 1–2.5 dm. diametro; capitulis circiter 1 cm. altis radiatis; involucri campanulatis parce cal-yculatis glabris; involucri squamis plerumque 21 lanceolatis vel lineari-lanceolatis 5–6 mm. longis acuminatis acutis; flos-culis liguliferis ca. 13, ligulis oblongis 5–6 mm. longis flavis;

floribus disci numerosis 50–60; achæniis maturitate 2–3 mm. longis striatis glabris.

Specimens examined:

California (?): "Mohave Region," April-May, coll. of 1884, *J. G. Lemmon*, 3130 (Gray Herb.), TYPE.

Arizona: Wickenburg, valley of the Hassayampa River, April, 1876, *Dr. Edward Palmer*, 614 (Gray Herb. and Mo. Bot. Gard. Herb.).

The specimens cited may be looked for in herbaria under *S. multilobatus* Torr. & Gray, to which the species here proposed is related, but from which it differs in well developed specimens in the outline and size of the leaves, loose inflorescence, and larger heads with 21 instead of 13 involucre bracts. *S. prolixus* has rather more the aspect of *S. Breweri* Davy.

Senecio (§ **Tomentosi**) **appendiculatus** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

S. neo-mexicanus Gray, Proc. Am. Acad. 19: 55. 1883, in part; Syn. Fl. 1²: 392. 1884, in part, as to plant of Thurber.

Herbaceus perennis ubique plus minusve albo-tomentosus; caulibus subcæspitosis erectis 1.5–3 dm. altis striatis sæpe foliaceis; foliis radicalibus oblanceolatis vel oblongo-obovatis petiolo incluso 3.5–10 cm. longis 0.5–2 cm. latis dentatis ad basin in petiolum paulatim angustatis integris, eis caulinis petiolatis vel sessilibus 2–7 cm. longis ad basin plerumque ampliatis irregulariter dentatis subamplexicaulibusque; inflorescentiis terminalibus corymboso-cymosis 6–12-cephalis; capitulis 10–12 mm. altis radiatis; involucri campanulatis minute calyculatis; involucri squamis plerumque 21 lanceolatis 5–7 mm. longis acutis sparsissime tomentulosis; flosculis liguliferis ca. 13, ligulis flavis; floribus disci numerosis ca. 70; achæniis glabris.

Specimens examined:

New Mexico: Mule Spring, May, 1851, *Geo. Thurber*, 280 (Gray Herb.), TYPE; Organ Mountains, Dona Ana Co., 25 April, 1907, *E. O. Wootton*, 3370 (Mo. Bot. Gard. Herb.).

This species is related to *S. neo-mexicanus* Gray, to which it has been usually referred, but from which it differs in having a more leafy stem, undivided leaves, and with the stem-leaves commonly ampliatis into a more or less dentate half-clasping base, and finally in having glabrous instead of hirtellous achenes.

Senecio (§ **Tomentosi**) **convallium** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

Herbaceus perennis ubique sericeo-pubescentes; caulibus caespitosis erectis 3 dm. altis; foliis inferioribus rosulatis petiolatis elliptico-lanceolatis vel oblongo-oblancheolatis 2.5–6 cm. longis 5–12 mm. latis acutis integris vel supra mediam partem paucidentatis basi longe cuneatis integriusculis juventute utrinque sericeo-pubescentibus ætate supra plus minusve glabratis, foliis superioribus spathulato-oblancheolatis angusti-petiolatis; inflorescentiis corymboso-cymosis paucicapitatis; capitulis circiter 1 cm. altis subradiatis; involucri bracteis 13–15 lineari-attenuatis 7–9 mm. longis acutis sparse sericeo-tomentulosis; floribus femineis subligulatis; floribus disci 30–35; achaeniis 3.5 mm. longis striatis glabris.

Specimen examined:

Utah: Rabbit Valley, altitude 2130 m., August, 1875, *L. F.*

Ward, 704 of the "U. S. Geological and Geographical Survey of the Territories" (Gray Herb.), TYPE.

The species here characterized has been hitherto confused with *S. canus* Hook., from which it is readily distinguished by the subsericeous pubescence and technical characters of the head.

Senecio (§ **Tomentosi**) **kernensis** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

Herbaceus perennis ubique dense lanato-tomentosus; caule tereti erecto ca. 1 dm. alto; foliis inferioribus rosulatis petiolatis elliptico-oblongis vel oblongo-rotundatis 1–3 cm. longis 3–10 mm. latis apice obtusis vel rotundatis basi abrupte angustatis vel subtruncatis utrinque dense lanato-tomentosis, marginibus integris vel subcrenato-dentatis revolutisque, foliis superioribus bracteiformibus multum reductis; inflorescentiis terminalibus corymboso-cymosis paucicapitatis; capitulis 8–10 mm. altis radiatis 5–8 mm. (radii exclusis) diametro parce calyculatis; involucri squamis ca. 13 lineari-lanceolatis 5–6 mm. longis acutis floccoso-tomentulosis subglabris; achaeniis glabris.

Specimen examined:

California: South Fork of Kern River, altitude 3760 m., September, 1875, *Dr. J. T. Rothrock*, 334 of the "Explorations and

Surveys west of the 100th Meridian" (Gray Herb.), TYPE.

Senecio (§ **Tomentosi**) **macropus** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

S. arizonicus Gray, Syn. Fl. 1²: 392. 1884, in part, as to plant of Rusby.

Radix robusta in sicco 2.5 cm. diametro; caulibus erectis usque ad 7.5 dm. altis glabris vel in axillis foliorum albo-tomentulosis striatis plus minusve purpurascens; foliis radicalibus petiolatis lyrato-pinnatifidis petiolo incluso 10–14 cm. longis 4–5 cm. latis, segmentis paucijugis inæqualibus terminali majore ovato-oblongis 5–6 cm. longis grosse dentatis, ceteris cuneatis et dentatis vel linearibus et integris; foliis caulinis remotis sessilibus pinnato-lobatis semiamplexicaulibusque sursum sensim reductis; inflorescentiis terminalibus corymboso-cymosis; capitulis ca. 1 cm. altis radiatis, ligulis flavis; involucris campanulatis minute calyculatis; involucri squamis circiter 21 lineari-lanceolatis 6.5–8 mm. longis acutis glabris maturitate retrorsis; floribus disci numerosis; achæniis glabris.

Specimen examined:

Arizona: without definite locality, coll. of 1883, *H. H. Rusby*, 175 (Gray Herb.), TYPE.

Professor Rusby's plant was referred by Dr. Gray to *S. arizonicus* Greene, but from the very large root, the sublyrate, smooth and even somewhat glaucous radical leaves, and nearly naked stem it seems amply distinct.

Senecio (§ **Tomentosi**) **oreophilus** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

S. neo-mexicanus Gray, Proc. Am. Acad. 19: 55. 1883, in part; Syn. Fl. 1²: 392. 1884, in part, as to plant of Greene.

Herbaceous perennis juventate ubique tomentulosus denique plus minusve glabratus; caule tereti erecto striato 2–3 dm. alto subnudo 2–3-bracteato; foliis rosulatis petiolatis oblongo-ob lanceolatis vel oblongo-cuneatis petiolo incluso 3–10 cm. longis 0.7–2.5 cm. latis supra mediam partem crenato-dentatis basi in petiolum sensim angustatis integriusculis juventate utrinque albo-tomentulosis mox glabratis; bracteis caulinis linearibus apice basique parum ampliatis dentatisque; inflorescentiis laxè corymboso-cymosis usque ad 1 dm. diametro; capitulis 10–12 mm. altis calyculatis radiatis; involucris campanulatis basi tomentulosis ceteris glabris; involucri squamis plerumque 21

lanceolatis 6.5–8 mm. longis acutis; flosculis liguliferis ca. 12, ligulis oblongis 8 mm. longis 3 mm. latis 4–5-nerviis; floribus disci numerosis ca. 50; achæniis in angulis sursum hispidulis.

Specimen examined:

New Mexico: Pinos Altos Mountains, 6 May, 1880, *Edward Lee Greene* (Gray Herb.), TYPE.

A plant similar in habit to *S. neo-mexicanus* Gray, to which Dr. Greene's specimen was referred by Professor Gray in establishing that species. A careful study of all the original material, which has been made possible through the courtesy of Dr. B. L. Robinson, has shown that the *S. neo-mexicanus* of Dr. Gray consisted of at least three recognizably distinct forms of which Wright's No. 1415, as the first specimen cited, must be taken as the type. With the Wright plant several specimens at hand are almost the exact counterpart. The Greene plant in question, namely *S. oreophilus*, differs in several important particulars, notably in its essentially naked stem, oblong-cuneate leaves with subentire or sinuate-dentate margin, and a marked tendency for the foliage to become glabrous with age.

Senecio (§ **Tomentosi**) **oreopolus** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen. Plate 11.

Herbaceus perennis ubique albo-tomentosus; caulibus cæspitosis simplice vel ramosis 0.8–3 dm. altis; foliis inferioribus petiolatis ovato-ellipticis vel elliptico-lanceolatis vel rarius subobovatis 0.8–3.5 cm. longis 5–18 mm. latis obtusis vel supra mediam partem paucidentatis basi abrupte vel longe cuneatis integriusculis juventate utrinque albo-tomentosis ætate supra paululo subinde glabratis, petiolatis 1–6.5 cm. longis, foliis supremis grosse reductis petiolatis vel sessilibus integris vel rarius irregulariter dentatis basi sæpe expansis et subauricularibus; inflorescentiis corymboso-cymosis; capitulis plerumque ca. 1 cm. (8–14 mm.) altis radiatis parce calyculatis; involucri squamis plerumque 13 (9–13) lanceolatis vel lineari-lanceolatis 5–7 mm. longis acutis glabris vel leviter tomentulosis; flosculis liguliferis 5–13; floribus disci 20–30; pappi setis albis bracteis involucri longioribus; achæniis 3–3.5 mm. longis glabris.

Specimens examined:

California: Rock Creek Cañon, Basin of the Upper Kern River, Tulare Co., altitude 3050 m., July, 1904, *H. M. Hall & H. D. Babcock*, 5526 (Gray Herb.), TYPE; Natural Bridge, Volcano Creek, Basin of the Upper Kern River, altitude 2285 m., July, 1904, *H. M. Hall & H. D. Babcock*, 5433 (Gray Herb.); gravelly slopes, Little Kern River, altitude 3045–3350 m., April–September, 1897, *C. A. Purpus*, 5240 (Gray Herb. and Mo. Bot. Gard. Herb.); Castle Peak, near the highest point, altitude 2740 m., 5 August, 1903, *A. A. Heller*, 7102 (Gray Herb. and Mo. Bot. Gard. Herb.); Sierra Nevada, coll. of 1875, *John Muir*, 4452 (Mo. Bot. Gard. Herb.); near the summit of Silver Mountain, altitude 3350 m., coll. of 1863, *W. H. Brewer*, 2050 (Gray Herb.); Ebbett's Pass, *W. H. Brewer*, 2005 (Gray Herb.); Sonora Pass, *W. H. Brewer*, 2686 (Gray Herb.); Mono Pass, coll. of 1866, *H. N. Bolander*, 6140 (Gray Herb.).

Nevada: Mt. Rose, Washoe Co., altitude 3200 m., 26 August, 1911, *A. A. Heller*, 9882 (Mo. Bot. Gard. Herb.).

Forma *aphanactis*, forma nova.

Caulis circiter 1 dm. altus; foliis petiolo incluso 1.5–2.5 cm. longis 5–7 mm. latis; capitulis discoideis.

Specimen examined:

California: mountain peak near Sonora Pass, altitude 3200 m., coll. of 1863, *W. H. Brewer*, 1905 (Gray Herb.), TYPE.

Senecio (§ **Tomentosi**) **Wrightii** Greenm. Monogr. Senecio, pt. 1, 24. 1901; in Engl. Bot. Jahrb. 32: 20. 1902, nomen.

S. fastigiatus Gray, Pl. Wright. ii. 99. 1853, not Nutt.

Herbaceus perennis ubique subtomentosus; caule erecto 1–4 dm. alto foliato; foliis oblongo-ob lanceolatis vel lanceolatis indivisis et integris vel supra mediam partem paucidentatis juventate albo-tomentosis plus minusve glabratibus, inferioribus basi integriusculis in petiolum sensim angustatis, eis caulinis sessilibus basi sæpius ampliatis et irregulariter dentatis amplexicaulibusque; inflorescentiis terminalibus subcorymbosocymosis multicapitatis; capitulis 8–10 mm. altis minute calyculatis radiatis; involucris campanulatis basi subincrassatis tomentosis, bracteis involucri plerumque 13 lanceolatis 5–7 mm. longis acutis tomentulosis; flosculis liguliferis 6–8, ligulis anguste

oblongis ca. 8 mm. longis 4-5-nerviis; floribus disci ca. 30; achaeniis glabris.

Specimens examined:

New Mexico: ravines between the copper mines and the Mimbres, October, 1851, *Charles Wright*, 1289 (Gray Herb. and Mo. Bot. Gard. Herb.), TYPE; Santa Rita del Cobre, 22 September, 1880, *E. L. Greene* (Mo. Bot. Gard. Herb.); among spruce, Lookout Mine, Sierra Co., altitude 2680 m., *O. B. Metcalfe*, 1179 (Mo. Bot. Gard. Herb.).

Senecio (§ **Amplectentes**) **subauriculatus** Greenm. Monogr. Senecio, pt. 1, 25. 1901; in Engl. Bot. Jahrb. 32: 21. 1902, nomen. Plate 14.

Herbaceus perennis; caule erecto ramoso striato glabro; foliis in partibus superioribus caulinis anguste lanceolatis 5-15 cm. longis 0.5-1.5 cm. latis acuminatis acutis integris vel remote apiculato-denticulatis sessilibus et auriculo-semiamplexicaulibus vel basi in petiolum sensim angustatis et subdecurrentibus membraneis supra glabris juventate subtus floccoso-tomentosis denique plus minusve glabratibus; inflorescentiis terminalibus laxe subcorymboso-cymosis; pedunculis bracteatis, bracteis lineari-attenuatis; capitulis radiatis 12-14 mm. altis heterogamis; involueris campanulatis calyculatis albo-floccoso-tomentulosus, bracteolis calyculatis linearis acutis suberoso-marginatis; involueri squamis plerumque 21 lineari-lanceolatis ca. 1 cm. longis acutis et atro-penicillatis; flosculis liguliferis ca. 13, ligulis oblongis flavibus; floribus disci numerosis (50-60); pappi setis albis; achaeniis pubescentibus.

Specimen examined:

Mexico: State of Oaxaca, mountains southeast of Miahuatlan, altitude 2750-3170 m., coll. of 1895, *E. W. Nelson*, 2526 (Gray Herb.), TYPE.

A well marked species related to *S. Warszewiczii* A. Br. & Bouché and to *S. prionopterus* Rob. & Greenm.

Senecio (§ **Mulgedifolii**) **alatipes** Greenm. Monogr. Senecio, pt. 1, 25. 1901; in Engl. Bot. Jahrb. 32: 21. 1902, nomen.

Herbaceus perennis ubique glabrus; caule tereti striato erecto 1 m. vel ultra alto; foliis parte inferiori ignotis, eis caulinis petiolatis vel sessilibus amplexicaulibusque oblongo-ovatis vel oblongo-lanceolatis 0.5-1.5 dm. longis 2-5 cm. latis acutis vel

acuminatis indivisis vel subpanduriformibus utrinque glabris subtus pallidoribus, margine irregulariter calloso-dentatis; petiolis usque ad 12 cm. longis anguste alatis; inflorescentiis terminalibus paniculatis; capitulis 8–10 mm. altis discoideis 20–25-floris; involucris anguste campanulatis calyculatis glabris; involucri squamis plerumque 13 lineari-lanceolatis acutis penicillatis ca. 6 mm. longis; achæniis striatis glabris.

Specimen examined:

Mexico: State of Chiapas, between Teneapa and Yajalon, altitude 900–1520 m., 13 October, 1895, *E. W. Nelson*, 3277 (U. S. Nat. Herb., fragments and tracing in Gray Herb.), TYPE.

Senecio (§ *Mulgedifolii*) *callosus* Schz. Bip. in *Flora* 28: 498. 1845.

S. eximius Hemsl. Biol. Cent.-Am. Bot. 2: 239. 1881, as to synonymy.—*S. doratophyllus* Hemsl. l. c., in part, as to Bourgeau's No. 1086, not Benth.—*S. viejensis* and *S. latipes* Greenm. Monogr. *Senecio*, pt. 1, 25. 1901; in Engl. Bot. Jahrb. 32: 21. 1902, nomen.—*Cacalia Toluccana* DC. Prodr. 6: 328. 1837.—*C. prenanthoides* Gray, Proc. Am. Acad. 19: 53. 1883, in part, as to Bourgeau's No. 1086, not HBK.—*Erechthites runcinata* Hemsl. Biol. Cent.-Am. Bot. 2: 234. 1881, in part, as to Bourgeau's No. 1086, not DC.

Herbaceus perennis ubique glabrus vel sparsissime tomentellus; caule tereti erecto circiter 1 m. alto striato plus minusve purpurascenti; foliis radicalibus et eis caulinis infimis petiolatis vel sessilibus amplexicaulibusque runcinato-pinnatifidis, lobis remotis, usque ad 4 dm. longis 3–18 cm. latis utrinque glabris subtus pallidioribus calloso-dentatis, summis sessilibus et auriculato-amplexicaulibus indivisis lanceolato-attenuatis; inflorescentiis terminalibus laxè paniculatis polycephalis; capitulis discoideis 10–12 mm. altis calyculatis 15–34-floris; involucri squamis plerumque 13 (8–13) lineari-lanceolatis 8–10 mm. longis acutis glabris et corollis plus minusve purpurascentibus; pappi setis albis; achæniis striatis glabris.

Specimens examined:

Mexico: State of Mexico, Désierto Viejo pres Mexico, *Bourgeau*, 1086 (Gray Herb. and Berlin Herb.); near Guapimalpam, coll. of 1855, *Schaffner* (Gray Herb.); fir woods, Sierra de las Cruces, 11 December, 1892, *C. G. Pringle*, 5313 (Gray

Herb.); Sierra de las Cruces, altitude 3350 m., 11 February, 1899, *C. G. Pringle*, 7709 (Mo. Bot. Gard. Herb.); Mt. Ixtaccihuatl, altitude 2430–3350 m., *C. A. Purpus*, 100 (Gray Herb.); fir forests, Mt. Ixtaccihuatl, altitude 3350–3650 m., February, 1903, *C. A. Purpus*, 45 (Mo. Bot. Gard. Herb.). State of Vera Cruz, Las Vigas, near Jalapa, 2 December, 1903, *C. G. Pringle*, 11869 (Gray Herb.), *forma*. State of Oaxaca, without definite locality, *Cuming* (Gray Herb.). State of Colima, coll. of Jan. 9–Feb. 6, 1891, *Dr. Edward Palmer*, 1145 (Gray Herb.), distributed as “*Erechthites runcinata* DC.”

The examination of a large suite of herbarium specimens, particularly in the light of recently acquired material, has led the writer to place a somewhat different interpretation on this species than formerly; hence, a brief description is here given and a few specimens from widely distributed exsiccati, well illustrating the species, are cited.

Senecio (§ *Mulgedifolii*) **Coulteri** Greenm. Monogr. Senecio, pt. 1, 25. 1901; in Engl. Bot. Jahrb. 32: 21. 1902, nomen.

Cacalia runcinata Less. Linnæa 5: 162. 1830, not HBK.

Herbaceus perennis; caulibus erectis 3–6 dm. altis striatis paulo tomentulosis plus minusve purpurascentibus; foliis inferioribus petiolatis runcinato-pinnatifidis usque ad 3 dm. longis 1.5–6 cm. latis supra glabris subtus arachnoideo-tomentulosis inæqualiter et obtuse calloso-dentatis, foliis superioribus gradatim reductis sessilibus amplexicaulibusque; inflorescentiis terminalibus subcorymboso-cymosis; capitulis numerosis discoideis ca. 1 cm. altis brevi-calyculatis; bracteis involucri plerumque 13 lanceolatis acutis 8 mm. longis glabris et purpurascentibus; floribus disci 30–40; achæniis glabris.

Specimens examined:

Mexico: State of Vera Cruz, Real del Monte, *Dr. Thomas Coulter*, 429 (Gray Herb.), TYPE, *C. Ehrenberg*, 381 (Berlin Herb. and Gray Herb.); Mt. Orizaba, *Schiede*, 363 (Berlin Herb.). State of Mexico, on Nevada de Toluca, 15 October, 1903, *J. N. Rose & J. N. Painter*, 7940 (U. S. Nat. Herb. and Gray Herb.).

Senecio (§ *Mulgedifolii*) **iodanthus** Greenm. Monogr. Senecio, pt. 1, 25. 1901; in Engl. Bot. Jahrb. 32: 21. 1902, nomen. Plate 12.

Herbaceus perennis; caulibus 5–9 dm. altis foliaceis striatis glabris plus minusve purpurascens; foliis inferioribus plerumque lyrato-pinnatifidis oblongo-lanceolatis 1.5–3 dm. longis 3.5–9 cm. latis acutis vel acuminatis sinuato-callosodentatis supra glabris subtus juventate arachnoideo-tomentosis et sæpe crispo-puberulis fere glabris, foliis superioribus sursum gradatim reductis sessilibus amplexicaulibusque; inflorescentiis racemoso-paniculatis 2–5 dm. longis 0.3–1.2 dm. latis; capitulis 10–12 mm. altis discoideis calyculatis; bracteis involucri circiter 13 lanceolatis 8 mm. longis acutis vel obtusis penicillatis glabris vel sparse puberulis purpurascens; floribus disci ca. 24; pappi setis albis quam corolla brevioribus; corollis albis vel purpurascens; achæniis glabris.

Specimens examined:

Mexico: State of Mexico, in pine woods, Nevada de Toluca, altitude 3000–3600 m., 26 September, 1892, *C. G. Pringle*, 4302 (Gray Herb. and Mo. Bot. Gard. Herb.), TYPE. State of Morelos, Tres Marias Mts., altitude 2895 m., 5 November, 1903, *C. G. Pringle*, 11498 (Gray Herb.).

This species is closely related to *S. Coulteri* Greenm. but differs in having a smooth and more leafy stem, nearly glabrous leaves, and distinctly racemose-paniculate inflorescence.

Senecio purpurascens Klatt, *Leopoldina*, Heft 24, p. 126. 1888.

Var. **fossanervius** Greenm. *Monogr. Senecio*, pt. 1, 25. 1901; in *Engl. Bot. Jahrb.* 32: 21. 1902, nomen.

Formæ typicæ habitu simili; foliis inferioribus petiolatis, petiolo incluso, usque ad 11 cm. longis 1.5 cm. latis sinuato-dentatis vel ad basin sublyratis supra glabris fossanerviis subtus tomentellis et in nerviis pilosis; involucri squamis fere glabris.

Specimen examined:

Mexico: without definite locality, *E. W. Nelson*, 1308 in part (U. S. Nat. Herb., fragments in Gray Herb.), TYPE.

Senecio (§ Suffruticosi) carnerensis Greenm. *Monogr. Senecio*, pt. 1, 25. 1901; in *Engl. Bot. Jahrb.* 32: 21. 1902, nomen.

Perennis basi suffrutescens ubique plus minusve lignescens; caule tereti erecto simplici vel ramoso; foliis indivisis petiolatis vel sessilibus lanceolatis vel oblanceolatis 1.5–5 cm. longis usque ad 1 cm. latis acutis denticulatis juventate utrinque tomentosis

supra plus minusve glabratis subtus persistenter albo-tomentosis, superioribus subauriculatis; inflorescentiis terminalibus paucicapitatis; capitulis ca. 1 cm. altis brevi-calyculatis radiatis; bracteis involucri plerumque 13 anguste lanceolatis apice atratis acutis glabris vel parce tomentulosis; flosculis liguliferis plerumque 8, ligulis flavis 4-nerviis; floribus disci 30-40 achæniis sursum brevi-sericeo pubescentibus.

Specimen examined:

Mexico: State of Coahuila, mountains, Carneros Pass, altitude 3050 m., 8 September, 1889, *C. G. Pringle*, 2857 (Gray Herb., photograph in Mo. Bot. Gard. Herb.), TYPE.

This species was originally referred to *S. longilobus* Benth., but it is more closely allied to *S. stoechadiformis* DC. and *S. Picridis* Schauer; it is readily separated from both these species by having fewer involucre bracts, short, appressed and black-tipped bracteoles suggesting those of *S. vulgaris* L.

Senecio (§ **Suffruticosi**) **flicifolius** Greenm. Monogr. Senecio, pt. 1, 25. 1901; in Engl. Bot. Jahrb. 32: 21. 1902; Contr. U. S. Nat. Herb. 16: 19. 1912, nomen.

Herbaceus perennis (?) erectus ramosus 1.5-4 dm. altus ubique glabrus; caule tereti ad basin plus minusve lignescenti; ramis ramulisque striatis stramineis; foliis sessilibus vel subalato-petiolatis pectinato-pinnatifidis 1.5-8 cm. longis 1-6 cm. latis; segmentis linearis attenuatis acutis; inflorescentiis subcorymbosocymosis oligocephalis; capitulis ca. 12 mm. altis ligulatis; involucri campanulatis calyculatis; involucri squamis plerumque 21 bracteolis calyculatis duplo longioribus lineari-lanceolatis acutis glabris vel juventate parce tomentulosis mox glabratis; flosculis liguliferis ca. 12, ligulis flavis; floribus disci 50-60; pappi setis albis; achæniis sursum sericeo-hispidulis.

Specimens examined:

Arizona: Valley of the Santa Cruz River, 11 May, 1881, *C. G. Pringle*, 316 (Gray Herb.), TYPE; Tucson, 12 March, 1892, *J. W. Toumey*, 708 (Gray Herb.); Tempe, coll. of 1892, *Ganong & Blaschka* (Gray Herb.); Hart's Ranch, 17 miles south of Tucson, 11 April, 1903, *J. J. Thornber*, 436 (Mo. Bot. Gard. Herb.); Ft. Huachuca, coll. of 1894, *Maj. T. E. Wilcox* (Mo. Bot. Gard. Herb.); open cañons, San Francisco Mts., April, 1887, *H. H. Rusby*, 214 in part (Mo. Bot. Gard. Herb.).

Mexico: Sandy plains near Altar, State of Sonora, 4 April, 1884, *C. G. Pringle* (Gray Herb.).

This species has been hitherto included with *S. Douglasii* DC. from which it differs in being essentially glabrous throughout, in having usually more numerous and shorter lateral leaf-segments, fewer, shorter, and less conspicuous calyculate bracteoles.

Senecio (§ *Suffruticosi*) **teliformis** Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

Herbaceus perennis; caule erecto tereti superne striato stramineo floccoso-tomentoso plus minusve glabrato; foliis supremis sessilibus lanceolato-attenuatis 3–6 cm. longis ad basin ampliatis usque ad 1.5 cm. latitudine semiamplexicaulibusque supra juventate floccoso-tomentosis plus minusve glabris subtus persistenter albo-tomentosis, margine dentatis vel denticulatis revolutisque; foliis inferioribus ignotis; inflorescentiis terminalibus corymboso-cymosis multicapitatis bracteatis floccoso-tomentosis; capitulis 8–10 mm. altis radiatis calyculatis, bracteolis calyculatis lineari-attenuatis conspicuis subflaccidis floccoso-pubescentibus; involucri bracteis plerumque 21 lineari-lanceolatis 5–6 mm. longis acutis glabris penicillatis; flosculis liguliferis sæpius 8, ligulis oblongis 5–6 mm. longis flavis; floribus disci ca. 40 quam bracteis involucri longioribus, pappi setis albis; achæniis sursum adpresso-sericeo-pubescentibus maturitate 3 mm. longis.

Specimen examined:

Mexico: State of Oaxaca, mountains of Telixtlahuaca, altitude 2500 m., 10 December, 1894, *Rev. Lucius C. Smith*, 367 (Gray Herb., photograph and fragments in Mo. Bot. Gard. Herb.), TYPE.

Although only the upper part of the plant is at present known to the writer, nevertheless it evidently belongs to the section *Suffruticosi* and appears to be most closely related to *S. Picridis* Schauer and *S. alvarezensis* Greenm. From the former it differs by the usually broader base of the upper stem leaves, more numerous heads and conspicuous bracteoles, while from the latter it is readily separated on foliar characters alone.

Senecio (§ *Palmatinervii*) **albonervius** Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

Arborescens 2–4 m. altus; caule tereti primo albo-tomentuloso maturitate glabrato et cortice brunneo tecto; foliis petiolatis basi palmatinerviis late ovatis 3–5 cm. longis latisque sinuato-5–11-lobatis remote calloso-mucro-denticulatis basi cordatis juventate utrinque tomentulosis plus minusve glabratibus supra in nerviis persistenter albo-tomentulosis, petiolis plerumque 3–10 (usque ad 14 cm.) longis; inflorescentiis terminalibus paniculatis multicapitatis; capitulis 10–12 mm. altis radiatis; involucris anguste campanulatis vel subcylindricis brevicalyculatis; involucri squamis circiter 8 lineari-lanceolatis vel oblongis obtusis 5–6 mm. longis glabris vel parce tomentulosis; flosculis liguliferis plerumque 5, ligulis 5–7 mm. longis flavis 4-nervatis, pappi setis tubo corollæ longioribus; floribus disci 8–10; acheniis glabris.

Specimens examined:

Mexico: State of Mexico, Valley of Temascaltepec, April, 1831, *Schiede* (Berlin Herb. and Gray Herb.), TYPE; open woods, Ixtaccihuatl, altitude 2430–3350 m., March–July, 1903, *C. A. Purpus*, 201 (Gray Herb. and Mo. Bot. Gard. Herb.). State of Vera Cruz, Mineral del Monte, *Ehrenberg*, 324 (Berlin Herb. and Gray Herb.). State of Morelos, Sierra de Tres Marias, altitude 3050 m., 15 April, 1904, *C. G. Pringle*, 8903 (Gray Herb. and Mo. Bot. Gard. Herb.). State of Michoacan, north slope of Mt. Tancitaro, altitude 2280–3200 m., 24 February, 1903, *E. W. Nelson*, 6904 (U. S. Nat. Herb. and Gray Herb.).

The broadly ovate, shallowly sinuate-lobed leaves with persistent white tomentum on the veins of the upper leaf-surface, together with a terminal many-headed panicle and yellow ray-flowers, render this species distinct and easily recognized among all those of the palmately veined section to which it belongs.

***Senecio angulifolius* DC., var. *ingens*, var. nov.**

Habitu et foliis formæ typicæ; inflorescentiis compactis pauci- vel multi-capitatis, bracteis bracteolisque perconspicuis; capitulis 1.5–2 cm. altis 40–45-floris radiatis vel discoideis.

Specimens examined:

Mexico: Mt. Ixtaccihuatl, above timber line, March–July, 1903, *C. A. Purpus*, 193 (Mo. Bot. Gard. Herb.), TYPE; rocky slopes, Mt. Ixtaccihuatl, altitude 5790–6090 m.,

November, 1905, *C. A. Purpus*, 1517 (Mo. Bot. Gard. Herb.). State of Puebla, Mt. Orizaba, near Chalchicomula, 25 February, 1892, *Jared G. Smith*, 473 (Mo. Bot. Gard. Herb.).

On account of the conspicuous more or less foliaceous bracts of the inflorescence *S. angulifolius* DC. is a very characteristic species and is almost always recognized without difficulty. There is, however, a considerable variation in the size of the heads and in the number of flowers of the disk, as well as in the degree of development of the ray-flowers. In fact the latter may be well developed, more or less reduced, or entirely absent. The extremely large headed form, which is well exemplified by the specimens cited above, seems well worthy of varietal recognition. Doctor Purpus's No. 1517 is somewhat intermediate between the species and the variety.

Senecio (§ *Palmatinervii*) *brachyanthus* Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

Verisimiliter frutex; caule tereti cortice brunneo tecto juven-tate hirtello-puberulento glabrato; foliis longipetiolatis sub-peltatis palmatinerviis suborbicularis circiter 7-lobatis mem-branaceis utrinque parce hirtellis subtus pallidioribus mucro-denticulatis, petiolis usque ad 13 cm. longis minute puberulentis; inflorescentiis terminalibus subglanduloso-hirtellis; capitulis sub-cylindricis 10–12 mm. altis heterogamis; involucri bracteis 8 lanceolatis 8–10 mm. longis acutis vel obtusis plus minusve purpurascentibus extus subglanduloso-hirtellis; flosculis fem-ineis 5 multum reductis, ligula nulla, tubo gracili squamis invol-ueri brevioris; floribus disci 8–10; pappi setis albis; achæniis glabris.

Specimen examined:

Mexico: State of Guerrero, between Ayusinapa and Petatlan, altitude 1540–2155 m., *E. W. Nelson*, 2137 (Gray Herb. and U. S. Nat. Herb.), TYPE.

The leaves and reduced ray-flowers of this species are similar to those of *S. cordovens* Hemsl., but the character of the involucre indicates a closer relationship with *S. chapalensis* Watson.

Senecio (§ *Palmatinervii*) *chapalensis* Watson, Proc. Am. Acad. 25: 155. 1890.

Var. *areolatus* Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

A forma typica recedit foliis utrinque glabratibus subtus areolatis, petiolis usque ad 15 cm. longis plus minusve purpurascens; flosculis liguliferis granditer reductis.

Specimen examined:

Mexico: State of Morelos, on shaded bluffs of a wet canyon above Cuernavaca, altitude 1980 m., 15 February, 1899, C. G. Pringle, 8010 (Gray Herb. and Mo. Bot. Gard. Herb.), TYPE.

Senecio (§ *Palmatinervii*) *Chrismarii* Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

Frutex; caule primo parce pubescenti maturitate glabro; foliis petiolatis palmatinerviis circumscriptione triangulari-ovatis 7-10 cm. longis 5-8 cm. latis hastatis 3-5-lobatis ciliatis mucro-denticulatisque granditer cordatis supra sparse hirtello-puberulentis subtus glabris vel in nervis puberulentis, lobiis mucronato-acutis; petiolis gracilibus 4-9 cm. longis parce hirtellis vel glabris; inflorescentiis terminalibus laxè paniculatis paucicapitatis dense glanduloso-puberulentis, pedunculis gracilibus remote bracteatis; capitulis 1.2-1.5 cm. altis discoideis paucicalyculatis; involucri squamis sæpius 8 lanceolato-oblongis ca. 1 cm. longis acutis penicillatis extrinsecus hirtello-puberulentis plus minusve purpurascens interioribus scarioso-marginatis; floribus disci plerumque 20 involucri bracteis longioribus; pappi setis albis; achæniis glabris.

Specimen examined:

Mexico: without definite locality, *Chrismar* (Berlin Herb., tracing and fragments in Gray Herb.), TYPE.

The affinity of this species is with *S. hederæfolius* Hemsl., *S. anisophyllus* Klatt, and *S. alienus* Robinson & Seaton. From the first two it differs in having deeply cordate leaves with more or less reflexed lateral lobes, and from the last it is readily separated by the deeply cordate leaves and absence of peltation.

Senecio (§ *Palmatinervii*) *hypomalacus* Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

Plate 10.

Frutex erectus; caule tereti primo dense sordido-puberulento, sæpissime lenticellis intermixtis, maturitate cortice brunneo tecto; foliis petiolatis vel supremis sessilibus circumscriptione ovato-rotundatis vel ovato-oblongis palmato-3-5-nerviis distincte 5-11-lobatis supra crebe crispo-hirtellis subtus lanato-tomentosis basi cordatis vel subtruncatis, margine sinuatis calloso-denticulatis ciliatis; petiolis usque ad 6 cm. longis; inflorescentiis terminalibus paniculatis polycephalis subglanduloso-hirtellis; capitulis 10-12 mm. altis parce calyculatis radiatis; bracteis involucri plerumque 8 (non-nunquam 7) oblongis vel subobovatis 5-6 mm. longis obtusis vel acutis extus crebe subglanduloso-hirtellis, interioribus late scarioso-marginatis; flosculis femineis liguliferis, ligulis anguste oblongis 5-6 mm. longis flavis; floribus disci circiter 10 (7-13) quam involucrium bis tanto fere longioribus; pappi setis albis; achæniis glabris.

Specimens examined:

Mexico: State of Oaxaca, mountains of Telixtlahuaca, altitude 2375 m., 10 December, 1894, *Rev. Lucius C. Smith*, 368 (Gray Herb., photograph and fragments in Mo. Bot. Gard. Herb.), TYPE; Sierra de San Felipe, altitude 2130-2440 m., 17 November, 1894, *Charles L. Smith*, 210 (Mo. Bot. Gard. Herb.); Cerro de San Felipe, altitude 1900 m., 25 September, 1895, *C. Conzatti*, 119 (Gray Herb.).

This species is related to *S. oaxacanus* Hemsl., but differs from it in having distinctly lobed leaves which are thicker in texture, densely subglandular-hirtellous above and soft tomentose beneath; moreover, the leaf-margin of *S. hypomalacus* is markedly sinuate and the lobes show a tendency to become again lobate. C. and E. Seler's No. 1581 from Tillantongo, which has been referred to *S. oaxacanus* Hemsl., is somewhat intermediate between the two species, but it has the leaf-outline and thinner texture of Mr. Hemsley's species.

Senecio (§ Palmatinervii) Kerberi Greenm. Monogr. Senecio, pt. 1, 26. 1901; in Engl. Bot. Jahrb. 32: 22. 1902, nomen.

Herbaceus robustus perennis usque ad 3m. altus; caule tereti erecto glabro vel parce tomentuloso; foliis petiolatis palmato-5-7-nerviis ovato-oblongis 5-10 cm. longis 5-8 cm. latis 5-7-lobatis carnosio-denticulatis reticulato-venosis supra sparse hirtellis subtus subarachnoideo-tomentulosis, lobis obtusis vel

subrotundatis et mucronato-acutis; petiolis 2-2.5 cm. longis; inflorescentiis terminalibus paniculatis multi-capitatis pubescentibus, pedunculis minute bracteatis; capitulis 7-8 mm. altis radiatis; involucris campanulatis minute calyculatis fere glabris; involucri squamis 13 lineari-lanceolatis vel lanceolato-oblongis 4.5-5 mm. longis acutis glabris; flosculis femineis 5 liguliferis, ligulis oblongis 4-5 mm. longis flavis; floribus disci ca. 14, pappi setis albis; achæniis glabris.

Specimen examined:

Mexico: "Tromptero, Mesa del Arrero," 21 November, 1880, Kerber, 94 (Berlin Herb., fragments and tracing in Gray Herb.), TYPE.

This species is known at present from a single specimen in the Royal Botanical Museum of Berlin. From this specimen the writer was permitted, as in a number of other cases, while making a study of the genus several years ago, to make a tracing and take fragments for the Gray Herbarium of Harvard University. The species is related to *S. Hartwegi* Benth. and *S. reglensis* Greenm., but from these and from other species of the section *Palmatinervii* to which it belongs, it is readily distinguished by the somewhat elongated more or less fan-shaped and bluntly lobed leaves.

Senecio (§ *Palmatinervii*) **velatus**, sp. nov. Plate 13.

Frutex; caule tereti carnosio ramoso ad apicem sordido-tomentoso cetero glabro in sicco cortice brunneo tecto; foliis petiolatis palmato-7-nerviis circumscriptione ovato-rotundatis ca. 10 cm. longis latisque angulato-7-9-lobatis membranaceis integris juventate utrinque plus minusve albo-tomentosis subtus persistenter arachnoideo-tomentulosis, lobis triangulari-ovatis mucronato-acutis; petiolis ca. 8 cm. longis floccoso-pubescentibus; inflorescentiis terminalibus dense cymoso-corymbosis minute bracteatis multicapitatis glabris vel in axillis ramulorum floccoso-tomentulosis; capitulis ca. 1.5 cm. altis radiatis; involucri subcylindrici squamis sæpius 8 lanceolato-linearibus vel lanceolato-oblongis 7-10 mm. longis acutis vel obtusis; flosculis liguliferis 3-5, ligulis anguste oblongis ca. 1 cm. longis; floribus disci 6-7, pappi setis albis; achæniis glabris striatis.

Specimen examined:

Mexico: State of Jalisco, on bluffs of barranca, near Guadalajara, 20 May, 1891, *C. G. Pringle*, 5160 (Gray Herb., photograph and fragments in Mo. Bot. Gard. Herb.), TYPE.

The writer has withheld publication of this species for several years with the hope that additional material might be secured. Mr. Pringle's specimen, from which the above description is drawn, is in the Gray Herbarium and consists of a terminal portion of a flowering stem and two detached leaves. In stem and inflorescence characters it corresponds very well with typical specimens of *S. præcox* DC. except that the terminal portion of the stem and branches are covered with a tawny pubescence, not glabrous as is usually the case with the DeCandolleian species. On account of the similarity of stem and inflorescence and because of the detached leaves the plant has been referred doubtfully to the peculiarly characteristic and well known *S. præcox* DC.

The extreme care with which Mr. Pringle prepared his plant material and the fact that the leaves on the specimen under consideration, although detached from the stem, accord with the type of foliage of the section *Palmatinervii* lead me to believe that we have to deal in the present case with an unrecorded species related to but distinct from *S. præcox* DC., and in all probability one of limited geographical distribution.

Senecio Klattii, nom. nov.

S. roseus Klatt, Ann. k. k. Naturhist. Hofmus. Wien 9: 366. 1894, not. *S. roseus* Schz. Bip. in Flora 28: 498. 1845.

EXPLANATION OF PLATE

PLATE 10

Senecio hypomalacus Greenm.

Mexico

From the type specimen, Rev. Lucius C. Smith No. 368, in the Gray Herbarium of Harvard University.



GREENMAN—NORTH AMERICAN SENECTIONEAE

EXPLANATION OF PLATE

PLATE 11

Senecio oreopolus Greenm.

California

From the type specimen, Hall and Babcock No. 5526, in the Gray Herbarium of Harvard University.



GREENMAN — NORTH AMERICAN SENECTIONEAE

COCKAYNE, BOSTON

EXPLANATION OF PLATE

PLATE 12

Senecio iodanthus Greenm.

Mexico

From the type specimen, Pringle No. 4302, in the Gray Herbarium of Harvard University.



GREENMAN — NORTH AMERICAN SENECEIONEAE

EXPLANATION OF PLATE

PLATE 13

Senecio velatus Greenm.

Mexico

From the type specimen, Pringle No. 5160, in the Gray Herbarium of
Harvard University.



GREENMAN — NORTH AMERICAN SENECTIONEAE

EXPLANATION OF PLATE

PLATE 14

Senecio subauriculatus Greenm.

Mexico

From the type specimen, E. W. Nelson No. 2526, in the Gray Herbarium of Harvard University.